TOGA CD-ROM Description

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ABSTRACT

        The Tropical Ocean Global Atmosphere (TOGA) Program is a component of
the World Meteorological Organization (WMO)/International Council of
Scientific Unions (ICSU) World Climate Research Program (WCRP). One of the
objectives of TOGA, which began in 1985, is to determine the limits of
predictability of monthly mean sea surface temperature variations in tropical
regions. The TOGA program created a raison d'être for an explosive growth of
the tropical ocean observing system and a substantial improvement in numerical
simulations from atmospheric and oceanic general circulation models.
Institutions located throughout the world are involved in the TOGA-distributed
active data archive system. One technique to distribute the diverse TOGA data
sets, including results from general circulation models, is described in this
report.

        A compact disk—read only memory (CD-ROM) medium easily stores 660
megabytes. CD-ROM technology will ease transfer of data sets required to
implement the TOGA program. The enclosed CD-ROM contains TOGA data sets for
1985 and 1986, which were prepared by nine institutions. Variables on the CD-
ROM are barometric pressure, surface air temperature, dewpoint temperature,
Cartesian components of surface wind, surface sensible and latent heat fluxes,
Cartesian components of surface wind stress and of an index of surface wind
stress, sea level, sea surface temperature, and depth profiles of temperature
and current in the upper ocean. Some data sets are global in extent, some are
regional and cover portions of an ocean basin.

        Data on the CD-ROM can be extracted with an Apple Macintosh or IBM
Personal Computer (PC). However, the enclosed diskettes, which contain
application software to view data on the CD-ROM, are compatible only with an
IBM PC.

ACKNOWLEDGEMENTS

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1   INTRODUCTION

The idea of assembling various Tropical Ocean Global Atmosphere (TOGA) data sets on a compact disk—read only memory (CD-ROM) for easy distribution and utilization throughout the world occurred during a US-PRC Bilateral Symposium on Climate of the Western Tropical Pacific in Beijing, November 1988. Climate researchers require access to a variety of data sets. The enclosed CD-ROM is an attempt to distribute different kinds of data more efficiently.

This report describes each data set on the CD-ROM, the manner in which the data were reformatted prior to inclusion on the CD-ROM, the structure of the CD-ROM, and instructions to download data files from the CD-ROM to an IBM Personal Computer (PC) or Apple Macintosh microcomputer. The capability to download portions of large data sets based upon time and space criteria is provided. Application software to search and retrieve data files and to view the files in tabular and graphical formats on an IBM PC or compatible computer is provided on three floppy diskettes. Appendix A describes the application software.

A CD-ROM contains data stored in a spiral track that consists of pits and lands (Laub, 1986). Adjacent turns of the spiral are separated by 1.6×10^{-6} m, which results in 16,000 tracks per inch (tpi). For comparison, a double sided, double density 3.5-inch floppy disk contains 135 tpi. A block (sector) is the smallest addressable part of the recorded area (Anonymous, 1988). The total number of blocks is 333,000, which yields 682 megabytes (MB) for the capacity of a CD-ROM. Typically, the outer 5×10^{-3} m of the disk is not used because this area is most difficult to manufacture and keep clean. Currently, most vendors manufacture disks with a capacity of about 660 MB. The TOGA data sets occupy approximately 575 MB. The total volume of the TOGA CD-ROM is approximately 660 MB because of the way in which the data are blocked and the inclusion of additional documentation files.

The logical format of a CD-ROM was specified initially by an industry standard called High Sierra. Recently, the High Sierra standard was extended and published as an international standard, ISO 9660 (Anonymous, 1988). Currently, CD-ROM drivers for the DEC MicroVAX, IBM PC and compatibles, Apple Macintosh and SUN systems support the ISO 9660 standard format. The logical format of the TOGA CD-ROM is the ISO 9660 standard.

The minimum hardware requirements to use the TOGA CD-ROM are (1) Apple Macintosh II and Apple CD-ROM reader; (2) IBM PC or compatible, with 640K RAM and hard disk drive (2 MB; more if transferring files from CD-ROM to disk); color monitor with EGA (128 KB) graphics driver; CD-ROM reader with a current version of the MS DOS Extensions.

This CD-ROM contains selected observations and numerical model results of the initial two years of the TOGA Program (i.e., 1985 and 1986). All data sets on this CD-ROM (Table 1) were prepared by TOGA Data Centers and other institutions. The International TOGA Project Office in Geneva arranged for the transfer of the data sets to the the Jet Propulsion Laboratory (JPL).

Application software (Appendix A) for the IBM PC or compatible is provided on three floppy diskettes in executable form only and contains subroutines that perform (1) data file extraction and subsetting, (2) viewing data on a color graphics screen, and (3) downloading data to a peripheral device.

Table 1. Oceanographic and Meteorological Variables Contained on the TOGA CD-ROM

Variable	ECMWF	CAC	UKMO	MEDS	PMEL	UHAWAII	ORSTOM	FSU	IFREMER
AIRPRESS	X		X	X	X				
AIRTEMP	X		X	X	X				
DEWPOINT	X		X						
UWIND	X		X	X	X				
VWIND	X		X	X	X				
SENSHEAT	X								
LATHEAT	X								
TAUX	X						X	X	
TAUY	X						X	X	
SEALEV						X			
SSTEMP		X	X	X	X				X
SALIN									X
SUBTEMP					X				X
UOCN					X				
VOCN					X				
Atlantic	X	X	X	X			X		X
Indian	X	X	X	X				X	X
Pacific	X	X	X	X	X	X		X	X

All data on the CD-ROM are in standard ASCII format, except for ECMWF data, which are in binary WMO FM 92-VIII Ext GRIB format (ECMWF, 1988). Since all file formats are stated, the user may access all ASCII files with his or her own software. Files may be copied to the user's hard disk from the CD-ROM by using standard MS DOS commands. Macintosh users may access the files on the CD-ROM by using the mouse. "Clicking" and "dragging" icons representing data files on the CD-ROM to the icon representing their hard disk will copy files from the CD-ROM. Data files can be copied to a user's magnetic disk, or they may be transferred to a SUN or VAX for further processing by using a file transfer protocol, such as Kermit.

A utility for decoding and subsetting the ECMWF binary data is provided on the CD-ROM in CDROM:\SOFTWARE and is called EXTRACT.FOR (Section 4). This allows unpacking of the FM 92 GRIB format (ECMWF, 1988) to the user's hard disk on an IBM PC or compatible, or Apple Macintosh microcomputer. EXTRACT also allows spatial subsetting of the other gridded data sets (CAC, FSU and ORSTOM).

Table 2. TOGA CD-ROM Data Sets, With Names and Addresses of Individuals Responsible for the Preparation of Each Data Set. The Volume of Each Data Set Appears Below the Name of the Data Set.

Data Set	Name and Address of Responsible Individual
UKMO Ship (Surface) 101.6 MB	B. S. Fullager Meteorological Office, Met 01A(1), Headquarters Annexe, Eastern Road, Bracknell, Berkshire RG12 2UR, UNITED KINGDOM

Table 2. (contd)

Data Set	Name and Address of Responsible Individual
MEDS Drifting Buoy 88.3 MB	R. Wilson Marine Environmental Data Service, 1202-200 Kent Street, Ottawa, Ontario, CANADA K1A OE6
UHAWAII Sea Level 1.1 MB	K. Wyrtki TOGA Sea Level Center, University of Hawaii, MSB-317, 1000 Pope Road, Honolulu, HI 96822, USA
PMEL Moored Current Meter 2.2 MB	M. J. McPhaden NOAA/Pacific Marine Environmental Laboratory, 7600 Sand Point Way N.E., Seattle, WA 98115, USA
PMEL Moored Temperature 0.8 MB	S. P. Hayes NOAA/Pacific Marine Environmental Laboratory, 7600 Sand Point Way N.E., Seattle, WA 98115, USA
PMEL Island 0.1 MB	M. J. McPhaden NOAA/Pacific Marine Environmental Laboratory, 7600 Sand Point Way N.E., Seattle, WA 98115, USA
IFREMER Ship (Subsurface) 44.5 MB	J.-P. Rebert IFREMER/Centre de Brest, B.P. 90, 29280 Plouzane, FRANCE
ECMWF Surface Meteorological Fields 328.7 MB	L. Bengtsson ECMWF, Shinfield Park, Reading, Berkshire RG2 9AX, UNITED KINGDOM
CAC Sea Surface Temperature Field 4.3 MB	R. Reynolds NOAA NMC CAC, W/NMC52, 5200 Auth Road, Washington, D.C. 20233, USA
FSU Surface Pseudo-Stress Field 4.4 MB	J. J. O'Brien Mail Stop B-174, 012 Love Building, Florida State University, Tallahassee, FL 32306-3041, USA
ORSTOM Surface Pseudo-Stress Field 0.6 MB	J. Servain Centre ORSTOM de Brest, B.P. 90, 29280 Plouzane, FRANCE

2   DATA PROCESSING

Each data set is copied onto a magnetic disk, and EBCDIC data are converted to ASCII. All subsequent reformatting of the data is done with this data copy. Examination of the data verifies that the preliminary processing does not result in any loss or scrambling of data. The contents of each data set and the accompanying documentation are then examined to learn about the data values and conversion factors. The International System of Units is emphasized. In several cases, selected portions of a data set are deleted for compactness. The final format is copied onto an optical disk. Standard 9-track, 6250-bpi magnetic tapes are then created as input to the premastering process.

Premastering changes the file structures to the ISO 9660 format for the CD-ROM. The steps involved are (1) transferring the data to the premastering system; (2) loading the data into an ISO 9660-formatted hard disk; and (3) copying an image of the ISO 9660 hard disk to a medium compatible with the mastering system. Premastering was performed by Disk Manufacturing, Inc., Anaheim, California; this company also manufactured the CD-ROM.

2.1   Date and Time

Date and time on all files have a uniform format.

```
GENERAL FORMAT  =  YYYY-MM-DD HH:MM:SS.DDD              (GMT)
         DATE    =  YYYY  =  year (4-digit)
                    MM    =  month (1-12)
                    DD    =  day (1-31)
         TIME    =  HH    =  hour (0-23)
                    MM    =  minutes (0-59)
```

2.2   Latitude and Longitude

Latitude (LLL.LLL) and longitude (LLL.LLL) are expressed in degrees and fractions of degrees. The latitude range is 90.000 (north pole) to -90.000 (south pole) and the longitude range is 0.000 (Greenwich Meridian) to 359.999, increasing eastward.

Data received with latitude and longitude expressed in degrees and minutes or degrees, minutes, and seconds were converted to the LLL.LLL format by:

LLL.LLL = (degrees + minutes/60 + seconds/3600)

2.3   Wind Speed and Direction

Wind speed (WSPD) is in m s^{-1}. Wind speed data received in knots were converted to m s^{-1} by:

WSPD[m s^{-1}] = WSPD[knots]*1852/3600

The direction of the wind is defined to be the direction toward which the wind is blowing. East—west and north—south components of wind are defined by UWIND (positive toward the east) and VWIND (positive toward the north)

respectively. UWIND and VWIND were computed from wind speed (WSPD) and wind direction (WDIR) by:

$$UWIND = WSPD*SIN(WDIR*(PI/180))$$

$$VWIND = WSPD*COS(WDIR*(PI/180)).$$

3 CD-ROM DIRECTORY AND FILENAME STRUCTURE

The directory structure of the TOGA CD-ROM allows the user to choose data files independently of the application software. The files are organized into directories based primarily on data set. The notation used here for describing the directory/subdirectory structure of the TOGA CD-ROM is compatible with MS DOS. The same directory/subdirectory names will appear as folders on a Macintosh. Root directories containing data are:

CDROM:\UKMO
CDROM:\MEDS
CDROM:\UHAWAII
CDROM:\PMELCURR
CDROM:\PMELTEMP
CDROM:\PMELISLE
CDROM:\IFREMER
CDROM:\ECMWF
CDROM:\CAC
CDROM:\FSU
CDROM:\ORSTOM

Data files are found within the root directory for all but 4 of the 11 root directories: CDROM:\MEDS, CDROM:\IFREMER, CDROM:\ECMWF, and CDROM:\FSU, which contain the subdirectories described below.

The CDROM:\MEDS directory contains 10 subdirectories, which are based on the first 2 digits of the buoy identification number. The filenaming convention is described below. The 10 subdirectories are:

CDROM:\MEDS\DB0 for buoys DB00xxx-DB09xxx
CDROM:\MEDS\DB1 for buoys DB10xxx-DB19xxx
CDROM:\MEDS\DB2 for buoys DB20xxx-DB29xxx
CDROM:\MEDS\DB3 for buoys DB30xxx-DB39xxx
CDROM:\MEDS\DB4 for buoys DB40xxx-DB49xxx
CDROM:\MEDS\DB5 for buoys DB50xxx-DB59xxx
CDROM:\MEDS\DB6 for buoys DB60xxx-DB69xxx
CDROM:\MEDS\DB7 for buoys DB70xxx-DB79xxx
CDROM:\MEDS\DB8 for buoys DB80xxx-DB89xxx
CDROM:\MEDS\DB9 for buoys DB90xxx-DB99xxx.

The CDROM:\IFREMER directory contains five subdirectories, which are based on five types of temperature profiles:

CDROM:\IFREMER\XBT
CDROM:\IFREMER\BATHY
CDROM:\IFREMER\NANSEN
CDROM:\IFREMER\TESAC
CDROM:\IFREMER\SONDE.

The CDROM:\ECMWF directory contains a subdirectory for each parameter, and each parameter subdirectory contains 12 monthly subdirectories:

```
CDROM:\ECMWF\AIRPRESS\01JAN ... CDROM:\ECMWF\AIRPRESS\12DEC
CDROM:\ECMWF\AIRTEMP\01JAN ...  CDROM:\ECMWF\AIRTEMP\12DEC
CDROM:\ECMWF\DEWPOINT\01JAN ..  CDROM:\ECMWF\DEWPOINT\12DEC
CDROM:\ECMWF\LATHEAT\01JAN ...  CDROM:\ECMWF\LATHEAT\12DEC
CDROM:\ECMWF\SENSHEAT\01JAN ..  CDROM:\ECMWF\SENSHEAT\12DEC
CDROM:\ECMWF\SSTEMP\01JAN ....  CDROM:\ECMWF\SSTEMP\12DEC
CDROM:\ECMWF\TAUX\01JAN ......  CDROM:\ECMWF\TAUX\12DEC
CDROM:\ECMWF\TAUY\01JAN ......  CDROM:\ECMWF\TAUY\12DEC
CDROM:\ECMWF\UWIND\01JAN .....  CDROM:\ECMWF\UWIND\12DEC
CDROM:\ECMWF\VWIND\01JAN .....  CDROM:\ECMWF\VWIND\12DEC.
```

The CDROM:\FSU directory contains 2 subdirectories, one for the Indian Ocean pseudo-stress data and one for the Pacific Ocean pseudo-stress data:

```
CDROM:\FSU\INDIAN
CDROM:\FSU\PACIFIC.
```

Two additional root directories are:

```
CDROM:\INDEX
CDROM:\SOFTWARE.
```

The CDROM:\INDEX directory contains a complete list of the filenames and a description of the directory structure.

The CDROM:\SOFTWARE directory contains the FORTRAN source code to read and subset the ECMWF binary data and the CAC, FSU, and ORSTOM field data sets.

Filenames on the TOGA CD-ROM conform to the convention NAME.EXT where NAME is up to eight characters in length and the EXT is up to three characters in length. Table 3 contains the filename structure for each data set. These are compatible with UNIX, VMS, MS DOS, HFS and the ISO 9660 standard.

Table 3. TOGA CD-ROM Filename Convention

Data Set	Filename	Description
UKMO Ship (Surface)	SHPyyddd.DAT	Contains 10 days of ship data where yy = year, ddd = day of year.
MEDS Drifting Buoy	DBxxxxx.DAT	Contains all data for buoy ID = xxxxx.
UHAWAII Sea Level	DSLxxxA.DAT	Contains all sea level data for station xxx.
PMEL Moored Current Meter	PMEL1111.DAT	Contains all data from the current meter mooring at the equator and longitude = 1111.

Table 3. (contd)

Data Set	Filename	Description
PMEL Moored Temperature	Akkklll1.DAT	Contains all data from the temperature mooring at latitude = kkk and longitude = llll.
PMEL Island	abcdef.DAT	Contains all data from the Island = abcdef.
IFREMER Ship (Subsurface)	zyymm.DAT	Contains ship data from z-type of temperature profile where z=A=XBT z=B=bathymessage z=G=TESAC z=N=Nansen z=S=Sonde yy = year and mm = month.
ECMWF Surface Meteorological Fields	wyymmddz.DAT	Contains twice daily model analyzed fields where w=T=sea surface temperature w=A=air temperature at 2m w=P=air pressure w=U=U-component wind at 10m w=V=V-component wind at 10m w=D=dewpoint temperature at 2m w=S=sensible heat flux w=L=latent heat flux w=X=X-component wind stress w=Y=Y-component wind stress yy = year, mm = month, dd = day z=A=0000GMT z=B=0600GMT z=C=1200GMT z=D=1800GMT.
CAC Sea Surface Temperature Field	CLIMmmC.DAT	Contains monthly climatology (1950-1979 average), mm = month.
	ANALyymm.DAT	Contains monthly mean analysis, yy = year and mm = month.
FSU Surface Pseudo-stress Field	PACyymm.DAT	Contains Pacific Ocean monthly pseudo-stress field (X and Y components), yy = year and mm = month.
	CLIMmmFP.DAT	Contains Pacific Ocean monthly climatology (1966-1985 average) of pseudo-stress fields (X and Y components), mm = month.

Table 3. (contd)

Data Set	Filename	Description
	INDyymm.DAT	Contains Indian Ocean monthly pseudo-stress field (X and Y components), yy = year and mm = month.
	CLIMmmFI.DAT	Contains Indian Ocean monthly climatology (1977-1988 average) of pseudo-stress fields (X and Y components), mm = month.
ORSTOM Surface Pseudo-Stress Field	ATLyymm.DAT	Contains Atlantic Ocean monthly pseudo-stress field (X and Y components), yy = year and mm = month.
	CLIMmmO.DAT	Contains Atlantic Ocean monthly climatology (1964-1985 average) of pseudo-stress fields (X and Y components), mm = month.

4   EXTRACTION AND SUBSETTING OF FIELD DATA

The EXTRACT program reads the gridded field data from the ECMWF, CAC, FSU, and ORSTOM data sets on the TOGA CD-ROM; subsets the field by using a specified latitude and longitude range; and outputs ASCII data in a tabular format to a hard disk. In the case of the ECMWF data, the program also unpacks the binary data. An 8-bit image for the specified region may also be produced.

The source code for EXTRACT is provided on the CD-ROM in the CDROM:\SOFTWARE directory and is called EXTRACT.FOR. It is written in FORTRAN 77 and can be modified to run on, at least, an IBM PC or Macintosh by editing the source file and commenting or uncommenting certain lines, depending on the target system. Using an editor to search for "Mac" or "IBM" will find any sections of code that are particular to one machine or the other.

To run EXTRACT on an IBM PC or compatible, from the MS DOS prompt, change directories to the location of the program and type: EXTRACT.

To run EXTRACT on a Macintosh, double-click on the EXTRACT icon.

On either computer, EXTRACT will prompt for an input file that provides information about what data to extract. The input file is read by a list-directed read statement, so character strings must be enclosed in single quotes, with variables separated by commas. This input file may be created by any available text editor.

The order for the variables in the input file is: 'input-file', 'ascii-file', NWLAT, NWLON, SELAT, SELON, 'image-file' where 'input-file' is the full path specification of the file of interest; 'ascii-file' is the full path specification for an ASCII output file; NWLAT is the latitude of the northwest corner of the region of interest; NWLON is the longitude of the northwest corner of the region of interest; SELAT is the latitude of the southeast corner of the region of interest; SELON is the longitude of the southeast

corner of the region of interest; and 'image-file' is the path specification for an 8-bit image.

Latitudes range from 90.0 (north pole) to -90.0 (south pole) and longitudes range from 0.0 to 360.0 going eastward. The following are some examples of appropriate input files:

1. On an IBM PC with CD-ROM drive 'G:', the following input file will cause a subset from 60°N to 58°S and 0° to 18°E to be extracted from the file CLIM03C.DAT and output to the 'CLIM03C.OUT' file. An image file called 'IMAGE.DAT' will also be created:

'G:\CAC\CLIM03C.DAT','CLIM03C.OUT',60.,0.,-58.,18.,'IMAGE.DAT'

2. On a Macintosh, the following input file will cause a subset from 60°N to 58°S and 0° to 18°E to be extracted from the file CLIM03C.DAT;1 and output to the 'CLIM03C.OUT' file. On a Macintosh, the TOGA CD-ROM appears on the desktop as an icon called TOGA_0001:

'TOGA_0001:CAC:CLIM03C.DAT;1','CLIM03C.OUT',60.,0.,-58.,18.,' '

If no image or ASCII file is desired, enclose a space in single quotes for those arguments in the input file. On the Macintosh, directories and devices are delimited by colons, and the ';1' (a remnant of the VAX/VMS origin of these files) is required. The Macintosh is also case-sensitive. On the IBM PC, a colon delimits the device, and back slashes delimit directories.

Data are output to arrays so that the element (I=1,J=1) always corresponds to the northwest corner of the specified region. The I index describes longitude, which always increases eastward, from 0.0 to 360.0 (where 0.0 is Greenwich), and the J index describes latitude, which always decreases southward, from 90.0 to -90.0 (north pole to south pole).

4.1   ECMWF

The output format for the first line of ECMWF data is described below. Program EXTRACT outputs an average of the 6-hour accumulated sensible and latent heat fluxes and X- and Y-components of wind stress.

Column	Format	Descriptions
1	1X	space
2-5	I4	YEAR
6	'-'	punctuation
7-8	I2	MONTH
9	'-'	punctuation
10-11	I2	DAY
12	1X	space
13-14	I2	HOUR
15	':'	punctuation
16-17	I2	MINUTE
18-22	F5.1	NORTHERN LATITUDE
23-26	I4	NUMBER OF LATITUDINAL ROWS
27-30	F4.1	NUMBER OF LATITUDE RESOLUTION
31-35	F5.1	WESTERN LONGITUDE
36-39	I4	NUMBER OF LONGITUDINAL COLUMNS

Column	Format	Description
40-43	F4.	LONGITUDE RESOLUTION
44	1X	space
45-78	A34	PARAMETER NAME (air temperature, air pressure, etc.)

The second and subsequent lines have the format:

Column	Format	Description
1-80	10F8.2	10 data values

***** DATA FORMAT EXAMPLE *****

To extract ECMWF air temperatures between 90°N, 25°E and 90°S, 47.5°E at 0000 GMT on 4 July 1985 from ECMWF file A850704A.DAT, the input to the extract program for an IBM PC is:

'G:\ECMWF\AIRTEMP\07JUL\A850704A.DAT','A850704A.OUT',90.,25.,-90.,47.5,''

For an Apple Macintosh the input to the extract program is:

'TOGA_0001:ECMWF:AIRTEMP:07JUL:A850704A.DAT;1', (continued on next line)
'A850704A.OUT',90.,25.,-90.,47.5,''

The output to file A850704A.OUT has the following format:

```
1985-07-04 00:00   90.0  73 2.5   25.0  10 2.5 temperature at 2m (°C)
 -11.24  -11.24  -11.24  -11.24  -11.24  -11.24  -11.24  -11.24  -11.24  -11.24
 -10.46  -10.50  -10.55  -10.60  -10.66  -10.71  -10.76  -10.81  -10.86  -10.88
  -9.07   -9.09   -9.10   -9.09   -9.16   -9.30   -9.42   -9.50   -9.59   -9.73
  -5.44   -5.56   -5.44   -5.08   -5.09   -5.52   -5.80   -5.99   -6.22   -7.05
   -.19    -.52    -.96   -1.58   -2.35   -3.07   -3.85   -4.65   -5.55   -6.16
   -.36    -.39    -.63   -1.03   -1.69   -2.24   -2.76   -3.20   -3.70   -4.09
    .96     .88     .91     .81     .47    -.07    -.99   -1.80   -2.41   -2.81
```

4.2   CAC, FSU, and ORSTOM

The output formats for the first line of CAC, ORSTOM, and FSU data are described below.

Column	Format	Description
1	1X	space
2-5	I4	YEAR
6	'-'	punctuation
7-8	I2	MONTH
9-17	F9.3	NORTHERN LATITUDE
18-22	I5	NUMBER OF LATITUDINAL ROWS
23-27	F5.1	LATITUDE RESOLUTION
28-36	F9.3	WESTERN LONGITUDE
37-41	I5	NUMBER OF LONGITUDINAL COLUMNS
42-46	F5.1	LONGITUDE RESOLUTION
47	1X	space
48-70	A30	PARAMETER NAME (sea surface temperature, sea surface temperature climatology, Pacific pseudo-stress, etc.)

The second and subsequent lines of CAC data have the format:

Column	Format	Description
1-80	10F8.2	10 values

The second and subsequent lines of FSU and ORSTOM data have the format:

Column	Format	Description
1-80	10(F7.1,1X)	10 values

***** CAC DATA FORMAT EXAMPLE *****

To extract CAC climatological-mean (which is designated by the year 1900) monthly sea surface temperatures between 60°N to 58°S and 0° to 18°E for March from CAC file CLIM03C.DAT, the input to the extract program for an IBM PC is:

'G:\CAC\CLIM03C.DAT','CLIM03C.OUT',60.,0.,-58.,18.,'IMAGE.DAT'

For an Apple Macintosh, the input to the extract program is:

'TOGA_0001:CAC:CLIM03C.DAT;1','CLIM03C.OUT',60.,0.,-58.,18.,''

The output to file CLIM03C.OUT has the following format:

```
1900-03   60.000    60  2.0    0.000   10  2.0 sea surface temp. climatology
     6.51    6.20    5.73    5.17    3.16     .20   -1.49   -1.32   -1.80   -1.40
     6.22    5.86    5.33    3.95    1.11    1.29    -.16     .62    -.44     .66
     5.99    5.64    5.14    4.47    3.00    3.06    2.05    2.29    1.69    2.02
     6.11    5.75    5.31    4.69    3.97    3.38    3.08    2.93    2.90    2.88
```

***** FSU (or ORSTOM) DATA FORMAT EXAMPLE *****

To extract FSU monthly mean pseudo-stresses between 25°N to 23°S and 160° to 178°E in the Pacific for March 1985 from FSU file PAC8503.DAT, the input to the extract program for an IBM PC is:

'G:\FSU\PACIFIC\PAC8503.DAT','PAC8503.OUT',25.,160.,-23.,178.,'IMAGE.DAT'

For an Apple Macintosh, the input to the extract program is:

'TOGA_0001:FSU:PACIFIC:PAC8503.DAT;1','PAC8503.OUT',25.,160.,-23.,178.,''

The output to file PAC8503.OUT has the following format:

```
1985-03   25.000    25  2.0  160.000   10  2.0 Pacific  pseudo wind stress
   -45.0   -45.0   -48.0   -52.0   -56.0   -60.0   -64.0   -70.0   -70.0   -70.0
   -56.6   -60.0   -72.0   -80.0   -80.0   -80.0   -80.0   -77.5   -80.0   -75.0
   -70.0   -70.0   -73.3   -66.6   -80.0   -80.0   -80.0   -80.0   -80.0   -80.0
   -90.0   -90.0   -88.0   -84.0   -80.0   -80.0   -70.0   -70.0   -70.0   -80.0
   -80.0   -85.0  -100.0   -90.0  -106.6  -100.0  -100.0   -90.0   -95.0   -86.6
  -105.0  -120.0  -108.7  -120.0  -116.0  -116.0  -120.0  -122.5  -120.0  -120.0
```

5   UKMO SHIP (SURFACE) DATA

   Merchant ships recruited under the auspices of the World Meteorological
Organization are the major source of conventional meteorological observations
over the ocean.   These ships take observations of atmospheric and oceanic
parameters and transmit reports in real time to national meteorological
centers through satellite communication systems and coastal radio stations.
Also, a ship's logbooks containing meteorological observations are collected
at the ship's home port by the TOGA Marine Climatology Data Collection
Project.

   These data are located on the CD-ROM in the root directory UKMO (section
3). There are thirty-seven 10-day files and one file of 5 days for 1985;
similarly for 1986.

   A single tape containing 2 files (1985 and 1986 ship observations) was
received.   The tape is 9-track, unlabeled, in IMMT format, EBCDIC, 124-byte
record size, and 12400-byte block size.   The following variables do not appear
on the CD-ROM: format and temperature indicator, indicator for wind speed,
octant of the globe, cloud and visibility observations, present and past
weather, indicator for sea surface temperature, wave and ice accretion
measurements, source of observation and observation platform, country that has
recruited ship, and data beyond column 80 (except quality control indicators).

   The 1985-1986 UKMO data set contains about 55,000 records each month.
Table 4 shows the numbers of correct data, missing data, and doubtful data.
Data not flagged as correct were given a missing data value (i.e., -99.9).
Data with a variable wind direction were deleted because Cartesian wind
components are presented on the CD-ROM.

              Table 4.   UKMO Measurement Statistics

Parameter	Correct	Missing	Doubtful	Variable WDIR
UWIND/VWIN	126956	14074	5537	34319
AIRTEMP	1293570	10108	19816	
DEWPOINT	895934	385127	42433	
AIRPRESS	1299682	17201	6611	
SSTEMP	1148333	152317	22844	

   Data were scaled (e.g., wind speeds in knots were converted to m s^{-1})
prior to the tranfer to the CD-ROM (section 2). Spacing and appropriate
symbols were used ('-' between month and day, ':' between hours and minutes,
etc.) to make the raw data more readable. Within each file, data are ordered
by time.   The last two characters on each line are a carriage return and a
line feed.

       READ (iunit,80) YEAR,MONTH,DAY,HOUR,MIN,LAT,LON,
         *   UWIND,VWIND,AIRTEMP,WBDEW,WBIND,AIRPRESS,SSTEMP,SHIPID
   80 FORMAT (1x,i4,4(1X,i2),2(1x,f5.1),
         *   4(1x,f5.1),a1,1x,f6.1,1x,f5.1,1x,a7,5x)

Column	Format	Tag	M/V	Comment
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9	1X	'-'		
10-11	I2	DAY		
12	1X			
13-14	I2	HOUR		
15	1X	':'		
16-17	I2	MIN		MINUTES ARE BLANK
18	1X			
19-23	F5.1	LAT		LATITUDE (DEGREES)
24	1X			
25-29	F5.1	LON		LONGITUDE (DEGREES)
30	1X			
31-35	F5.1	UWIND	-99.9	E/W COMPONENT WIND (m s^{-1})
36	1X			
37-41	F5.1	VWIND	-99.9	N/S COMPONENT WIND (m s^{-1})
42	1X			
43-47	F5.1	AIRTEMP	-99.9	AIR TEMPERATURE (°C)
48	1X			
49-53	F5.1	WBDEW	-99.9	WETBULB OR DEWPOINT TEMPERATURE (°C)
54	A1	WBIND		WETBULB/DEWPOINT INDICATOR W=WETBULB D=DEWPOINT
55	1X			
56-61	F6.1	AIRPRESS	0.0	AIR PRESSURE (hPa)
62	1X			
63-67	F5.1	SSTEMP	-99.9	SEA SURFACE TEMPERATURE (°C)
68	1X			
69-75	A7	SHIPID		SHIP'S CALL SIGN
76-80	5X			

***** DATA FORMAT EXAMPLE *****

***** File SHP85001.DAT *****

```
1985-01-01 0:    0.5 202.0  -6.6   1.2  27.7  23.3W 1001.2  25.5     DNHH
1985-01-01 0:    1.1  93.5   0.8  -4.6  25.0 -99.9W 1011.6  30.0     ZEOH
1985-01-01 0:    1.4 140.4   6.3  -2.3  28.0  25.5W 1007.5  30.1     7KFT
1985-01-01 0:    2.0  96.1  -8.3  -9.9  27.0 -99.9W 1010.9  27.0     9WEM
1985-01-01 0:    2.0 237.5  -4.8   1.8  27.5  23.0W 1006.0  26.5     JGXU
1985-01-01 0:    2.2  91.8  -1.5  -0.5  26.4  21.4W 1009.2  28.1     5237
1985-01-01 0:    2.2 317.1  -6.7   0.0  27.0  25.0W 1012.1 -99.9     PPFB
```

6   MEDS DRIFTING BUOY DATA

These data are barometric pressure, air temperature, surface wind and sea surface temperature collected by satellite-tracked drifting buoys. UWIND and VWIND contained on the CD-ROM were computed from wind speed and wind direction. Of the 1,090,000 drifting buoy observations, 176,000 contain bad positions; these data were deleted from the CD-ROM. Of the remaining 916,000 observations, 714,000 contain missing or bad wind data.

The CDROM:\MEDS directory contains 10 subdirectories for the data files (section 3).

Four tapes for 1985 data and 4 tapes for 1986 were received. Tapes are 9-track, unlabeled, GF3 format, ASCII, 1920-byte block size, and 80-byte record size. The following variables are not included on the TOGA CD-ROM: quality-control flag for date/time; message-quality indicator; location flag; 3-hour air pressure tendency and associated quality-control flag; elapsed time since last fix; drift speed since last fix and associated quality-control flag; drift direction and associated quality-control flag; and 1-20 sampling depths and temperatures and quality-control flags.

The MEDS drifting buoy data format is 80 characters per line. The last two characters of each line are a carriage return and a line feed. Data are divided into 1 file per buoy. MEDS data contained wind speed in units of tenths of m s^{-1} and wind direction in units of tens of degrees. These data are converted to UWIND and VWIND in m s^{-1} prior to output to the CD-ROM (section 2). Appropriate symbols are used ('-' between month and day, ':' between hours and minutes, etc.) to make the raw data more readable. The buoy identification number is extracted from the series header and added to each line of the data.

```
      READ (iunit,80) YEAR,MONTH,DAY,HOUR,MIN,LAT,LON,AIRPRESS,
     *            AIRTEMP,SSTEMP,UWIND,VWIND,DRDPTH,BUOYID,CR,LF
   80 FORMAT (1x,i4,4(1X,i2),2(1x,f7.3),1x,f6.1,
     *     1x,f5.1,1x,f4.1,2(1x,f5.1),1x,i3,1x,a9,1x,2a1)
```

Column	Format	Tag	M/V	Comment
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9	1X	'-'		
10-11	I2	DAY		
12	1X			
13-14	I2	HOUR		
15	1X	':'		
16-17	I2	MIN		
18	1X			
19-25	F7.3	LAT		LATITUDE (DEGREES)
26	1X			
27-33	F7.3	LON		LONGITUDE (DEGREES)
34	1X			
35-40	F6.1	AIRPRESS	0.0	AIR PRESSURE (hPa)
41	1X			
42-46	F5.1	AIRTEMP	999.9	AIR TEMPERATURE (°C)
47	1X			
48-51	F4.1	SSTEMP	99.9	SEA-SURFACE TEMPERATURE (°C)
52	1X			
53-57	F5.1	UWIND	-99.9	E/W COMPONENT WIND (m s^{-1})
58	1X			
59-63	F5.1	VWIND	-99.9	N/S COMPONENT WIND (m s^{-1})
64	1X			
65-67	I3	DRDPTH	0	DROGUE DEPTH (m)
68	1X			
69-77	A9	BUOYID	none	BUOY ID #
78	1X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

```
***** DATA FORMAT EXAMPLE *****

***** File DB14801.DAT *****
1985-01-18  0:36  -5.367  74.233 1012.0  27.2 28.1 -99.9 -99.9   0 BUOY14801
1985-01-18  9:55  -5.383  74.167 1011.0  29.9 28.7 -99.9 -99.9   0 BUOY14801
1985-01-18 21:16  -5.383  74.300 1011.8  27.2 28.1 -99.9 -99.9   0 BUOY14801
1985-01-19  1:23  -5.417  74.050 1011.6  26.7 28.1 -99.9 -99.9   0 BUOY14801
1985-01-19  3:01  -5.433  74.050 1012.5  30.2 28.1 -99.9 -99.9   0 BUOY14801
1985-01-19  9:46  -5.483  74.033 1009.6  30.7 29.0 -99.9 -99.9   0 BUOY14801
1985-01-19 11:22  -5.483  74.033 1009.1  30.9 28.9 -99.9 -99.9   0 BUOY14801
```

7 UHAWAII SEA LEVEL DATA

The TOGA Sea Level Data Center collects sea level data in the Pacific Ocean from a network of island-based and coastal tide gauges, most of which have been recording since the early 1970's (Wyrtki et al., 1988). This CD-ROM contains daily averaged sea level values from 72 stations (Table 5).

Data are found on the CD-ROM in the root directory UHAWAII (section 3). There is one data file per sea level station.

A single tape containing 166 files was received. The tape contains daily and monthly sea level data for 83 stations, although 11 stations had no data. In addition, one floppy disk was received containing two files with corrections to files DSL302A.DAT and MSL302A.DAT. The tape is 9-track, unlabeled, ASCII, 80-byte record size and 8000-byte block size. Data are in NODC sea level format.

Table 5. List of TOGA Sea Level Stations in the Pacific Ocean

Station	Filename	Latitude	Longitude
Aburatsu	DSL354A.DAT	31°34.0'N	131°25.0'E
Acapulco	DSL316A.DAT	16°50.0'N	099°55.0'W
Alotau	DSL069A.DAT	10°21.0'S	150°29.0'E
Antofagasta	DSL080A.DAT	23°39.0'S	070°24.0'W
Arica	DSL083A.DAT	18°28.0'S	070°20.0'W
Balboa	DSL302A.DAT	08°58.0'N	079°34.0'W
Baltra-B	DSL003B.DAT	00°26.1'S	090°17.1'W
Bitung	DSL033A.DAT	01°26.4'N	125°11.6'E
Brisbane	DSL331A.DAT	27°22.0'S	153°10.0'E
Bundaberg	DSL332A.DAT	24°50.0'S	152°21.0'E
Cabo San Lucas	DSL034A.DAT	22°53.0'N	109°54.0'W
Caldera	DSL088A.DAT	27°04.0'S	070°50.0'W
Callao	DSL093A.DAT	12°03.0'S	077°09.0'W
Cendering	DSL320A.DAT	05°15.9'N	103°11.2'E
Chichijima	DSL047A.DAT	27°06.0'N	142°11.0'E
Christmas	DSL011A.DAT	01°59.1'N	157°28.6'W
Davao	DSL372A.DAT	07°05.0'N	125°38.0'E
Ensenada	DSL317A.DAT	31°51.0'N	116°38.0'W
Fanning	DSL012A.DAT	03°54.4'N	159°23.2'W
Fort Denison	DSL333A.DAT	33°51.0'S	151°14.0'E
Guam	DSL053A.DAT	13°26.0'N	144°39.0'E
Honiara	DSL009A.DAT	09°25.5'S	159°57.4'E
Honolulu	DSL057A.DAT	21°18.4'N	157°52.0'W
Honolulu (Kewalo)	DSL026A.DAT	21°17.7'N	157°51.7'W

Table 5.   (contd)

Station	Filename	Latitude	Longitude
Honolulu (Pier 45)	DSL027A.DAT	21°19.1'N	157°53.1'W
Johor Baharu	DSL321A.DAT	01°27.7'N	103°47.5'E
Jolo	DSL373A.DAT	06°04.0'N	121°00.0'E
Kanton	DSL013A.DAT	02°48.6'S	171°43.1'W
Kapingamarangi	DSL029A.DAT	01°05.9'N	154°46.6'E
Kavieng	DSL068A.DAT	02°36.0'S	150°48.0'E
Ko Lak	DSL328A.DAT	11°47.7'N	099°49.0'E
Kuantan	DSL322A.DAT	03°58.5'N	103°25.8'E
Kukup	DSL325A.DAT	01°19.5'N	103°26.6'E
Kwajalein	DSL055A.DAT	08°44.0'N	167°44.0'E
La Libertad-B	DSL091B.DAT	02°12.0'S	080°55.0'W
Lae	DSL067A.DAT	06°43.0'S	146°58.0'E
Legaspi	DSL371A.DAT	13°09.0'N	123°45.0'E
Lobos de Afuera	DSL084A.DAT	06°56.0'S	080°43.0'W
Loreto	DSL319A.DAT	26°01.0'N	111°22.0'W
Madang	DSL066A.DAT	05°09.0'S	145°48.0'E
Majuro	DSL005A.DAT	07°06.4'N	171°22.4'E
Malakal	DSL007A.DAT	07°19.8'N	134°27.8'E
Manila	DSL370A.DAT	14°35.0'N	120°58.0'E
Manus	DSL065A.DAT	02°02.0'S	147°27.0'E
Mera	DSL352A.DAT	34°55.0'N	139°50.0'E
Miyakejima	DSL357A.DAT	34°03.6'N	139°29.0'E
Mokuoloe	DSL061A.DAT	21°26.0'N	157°48.0'W
Naha	DSL355A.DAT	26°13.0'N	127°40.0'E
Nauru	DSL004A.DAT	00°31.7'S	166°54.3'E
Nawiliwili	DSL058A.DAT	21°58.0'N	159°21.0'W
North Point	DSL330A.DAT	22°18.0'N	114°12.0'E
Noumea	DSL019A.DAT	22°17.7'S	166°26.0'E
Ofunato	DSL351A.DAT	39°04.0'N	141°43.0'E
Papeete	DSL015A.DAT	17°31.5'S	149°34.0'W
Pohnpei	DSL001A.DAT	06°59.2'N	158°14.6'E
Port Moresby	DSL064A.DAT	09°30.0'S	147°10.0'E
Puerto Madero	DSL318A.DAT	14°43.0'N	092°26.0'W
Quarry Bay	DSL329A.DAT	22°18.0'N	114°13.0'E
Rabaul	DSL010A.DAT	04°12.0'S	152°10.5'E
Rarotonga	DSL023A.DAT	21°11.9'S	159°46.2'W
Rikitea	DSL016A.DAT	23°07.5'S	134°57.2'W
Saipan	DSL028A.DAT	15°13.6'N	145°44.5'E
Santa Cruz	DSL030A.DAT	00°45.2'S	090°18.7'W
Suva	DSL018A.DAT	18°07.9'S	178°25.6'E
Tarawa-B	DSL002B.DAT	01°19.9'N	173°00.8'E
Tioman	DSL323A.DAT	02°48.4'N	104°08.4'E
Townsville	DSL334A.DAT	19°15.0'S	146°50.0'E
Truk	DSL054A.DAT	07°27.0'N	151°51.0'E
Valparaiso	DSL081A.DAT	33°02.0'S	071°38.0'W
Wake	DSL051A.DAT	19°17.0'N	166°37.0'E
Wewak	DSL063A.DAT	03°34.0'S	142°39.0'E
Yap	DSL008A.DAT	09°30.5'N	138°07.7'E

The UHAWAII sea level data format is 22 characters per line. The last two characters of each line are a carriage return and a line feed. The first three lines of each file contain textual information about the sea level station. The remainder of the lines are daily sea level averages. There is one file per station. The date is added to each daily averaged sea level value.

```
      READ (iunit,40) LAT, LON, CR, LF
      READ (iunit,41) STATNAME, CR, LF
      READ (iunit,41) COUNTRY, CR, LF
      READ (iunit,43) YEAR,MONTH,DAY,SEALEV, CR, LF
   40 FORMAT (2X,F7.3,1X,F7.3,3X,2A1)
   41 FORMAT (4X,A16,2A1)
   43 FORMAT (1X,I4,1X,I2,1X,I2,1X,I5,3X,2A1)
```

***** LINE 1 *****

Column	Format	Tag	M/V	Comments
1	'C'			
2	1X			
3-9	F7.3	LAT		LATITUDE (DEGREES)
10	1X			
11-17	F7.3	LON		LONGITUDE DEGREES)
18-20	3X			
21	A1	CR		Carriage Return (0D hex)
22	A1	LF		Line Feed (0A hex)

***** LINE 2 *****

Column	Format	Tag	M/V	Comments
1	'C'			
2-4	3X			
5-20	A17	STATNAME		STATION NAME
21	A1	CR		Carriage Return (0D hex)
22	A1	LF		Line Feed (0A hex)

***** LINE 3 *****

Column	Format	Tag	M/V	Comments
1	'C'			
2-4	3X			
5-20	A17	COUNTRY		COUNTRY
21	A1	CR		Carriage Return (0D hex)
22	A1	LF		Line Feed (0A hex)

```
***** LINE 4 THROUGH END *****

Column      Format      Tag         M/V             Comments

1           1X
2-5         I4          YEAR                        DATE AND TIME ARE GMT
6           1X          '-'
7-8         I2          MONTH
9           1X          '-'
10-11       I2          DAY
12          1X
13-17       I5          SEALEV      99999           DAILY SEA LEVEL (mm)
18-20       3
21          A1          CR                          Carriage Return (0D hex)
22          A1          LF                          Line Feed       (0A hex)


***** DATA FORMAT EXAMPLE *****

***** File DSL001A.DAT *****
C    6.983 158.250
C    Pohnpei
C    Fd St Micronesia
 1985-01-01    778
 1985-01-02    773
 1985-01-03    776
 1985-01-04    757
 1985-01-05    769
 1985-01-06    756
```

8   PMEL MOORED CURRENT METER DATA

This data set contains daily averaged surface wind and upper ocean horizontal velocity and temperature measurements recorded by moored wind recorders and current meters (within the uppermost 250 m) along the equator in the Pacific Ocean (Freitag et al., 1987). Locations of moorings are 165°E, 140°W, 124.5°W, 110°W, and 108°W. The 108°W site does not contain surface wind and air temperature. Wind measurements are at 4 m above the surface. Air temperature is at 3 m above the surface and sea surface temperature is at 1 m below the surface. The direction of the current is defined to be the direction toward which the current is flowing. East-west and north-south components of current are defined by UOCN (positive toward the east) and VOCN (positive toward the north), respectively.

These data are found on the CD-ROM in the root directory PMELCURR (section 3).

A single tape containing 59 files, which included both the moored buoy data and the island data was received; the island data are discussed in Section 10. The tape is 9-track, unlabeled, 6250 bpi, ASCII, 50-byte record size and 5000-byte block size.

The moored current meter data format is 80 characters per line. The last two characters of each line are a carriage return and a line feed. The stations contain a variable number of records for each day. The first record of each day contains date and time, UWIND and VWIND, air temperature, sea surface temperature, and the number of depth measurements. The second and

subsequent records contain the depth, UOCN and VOCN, and the water temperature
for that depth. A depth/UOCN/VOCN/temperature reading is placed in each
record.

```
      READ (IUNIT,50)  IND,YEAR,MONTH,DAY,HOUR,MIN,
    *                  UWIND,VWIND,AIRTEMP,SSTEMP,TOTDPTHS,CR,LF
      READ (IUNIT,54)  IND,DEPTH,UOCN,VOCN,WTEMP,CR,LF
   50 FORMAT ('a1',i4,4(1x,i2),1x,4(1x,f8),2x,I4,18x,2a1)
   54 FORMAT ('a1',22x,i4,3(1x,f8),24x,2A1)
```

***** FIRST LINE OF EACH DAY *****

Column	Format	Tag	M/V	Comments
1	A1	IND		'D' = First Line of Data
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9	1X	'-'		
10-11	I2	DAY		
12	1X			
13-14	I2	HOUR		
15	1X	':'		
16-17	I2	MIN		BEGINNING OF 24-HOUR AVERAGING PERIOD
18	1X			
19	1X			
20-27	F8	UWIND	-999.99	E/W COMPONENT WIND (m s^{-1})
28	1X			
29-36	F8	VWIND	-999.99	N/S COMPONENT WIND (m s^{-1})
37	1X			
38-45	F8	AIRTEMP	-99.99	AIR TEMPERATURE (°C)
46	1X			
47-54	F8	SSTEMP	-99.99	SEA SURFACE TEMPERATURE (°C)
55-56	2X			
57-60	I4	TOTDPTHS		NUMBER OF DEPTH MEASUREMENTS
61-78	18X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** SECOND AND SUBSEQUENT LINES (Subsurface data) *****

Column	Format	Tag	M/V	Comments
1	A1	IND		'E' = Additional Line of Data
2-23	22X			
24-27	I4	DEPTH		DEPTH OF THIS MEASUREMENT (m)
28	1X			
29-36	F8	UOCN	-999.99	E/W COMPONENT CURRENT (cm s^{-1})
37	1X			
38-45	F8	VOCN	-999.99	N/S COMPONENT CURRENT (cm s^{-1})
46	1X			
47-54	F8	WTEMP	-99.99	WATER TEMPERATURE AT THIS DEPTH (°C)
55-78	24X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

```
***** DATA FORMAT EXAMPLE *****

***** File EPOC140W.DAT *****
D1985-01-01 00:00      -6.21      0.22     23.71     23.29      13
E                         10    -22.40     33.05     23.35
E                         25    -23.58     49.67     23.18
E                         35   -999.99   -999.99     22.98
E                         45     -5.80     34.13     22.75
E                         60   -999.99   -999.99     22.03
E                         80     56.34     21.10     20.88
E                        100   -999.99   -999.99     18.95
E                        120    106.20     18.63     16.86
E                        140   -999.99   -999.99     15.27
E                        160     66.76     20.57     13.94
E                        200   -999.99   -999.99     13.43
E                        250     21.81     17.38     12.02
E                        300   -999.99   -999.99     11.69
D1985-01-02 00:00      -4.10      0.88     23.62     23.51      13
E                         10     -9.89     38.88     23.44
E                         25     -6.40     61.63     23.21
E                         35   -999.99   -999.99     23.10
E                         45      6.39     52.93     22.92
E                         60   -999.99   -999.99     22.43
E                         80     39.85     37.31     21.54
E                        100   -999.99   -999.99     20.25
E                        120    113.27     15.48     17.78
E                        140   -999.99   -999.99     16.03
E                        160     67.42     22.38     14.20
E                        200   -999.99   -999.99     13.35
E                        250     22.28     17.60     12.04
E                        300   -999.99   -999.99     11.58
D1985-01-03 00:00      -5.35      0.61     23.76     23.40      13
E                         10     -0.52     33.51     23.62
E                         25      9.95     55.95     23.40
E                         35   -999.99   -999.99     23.21
E                         45     27.32     49.36     22.87
E                         60   -999.99   -999.99     21.87
E                         80     78.92     26.14     20.47
E                        100   -999.99   -999.99     18.60
E                        120    109.35     23.47     17.11
E                        140   -999.99   -999.99     15.67
E                        160     57.28     17.24     13.86
E                        200   -999.99   -999.99     12.87
E                        250     13.83     14.40     11.98
E                        300   -999.99   -999.99     11.74
```

9   PMEL MOORED TEMPERATURE DATA

This data set contains daily averaged surface wind, air temperature, and subsurface temperature profiles from moorings in the equatorial Pacific Ocean (Table 6). The data are time multiplexed to the surface acquisition system through a three-conductor double-armored cable. All data are telemetered to shore in real-time using the ARGOS system. Days for which there are no data values are omitted from the listings.

Table 6. Temperature Mooring Locations

Year	Latitude	Longitude
1985	5°N	110°W
1985	2°N	110°W
1985	2°S	110°W
1985	5°S	110°W
1985	8°S	110°W
1985	2°S	165°E
1986	2°S	165°E
1986	5°N	110°W
1986	2°N	110°W
1986	2°S	110°W
1986	5°S	110°W
1986	8°S	110°W
1986	2°N	140°W
1986	2°S	140°W
1986	2°N	165°E

These data are found on the CD-ROM in the root directory PMELTEMP (section 3).

A single tape containing 43 files was received. Each file contains data for up to one year at a single mooring location. The tape is 9-track, unlabeled, EBCDIC, 132-byte record size, and 13200-byte block size.

The PMEL moored temperature data format is 80 characters per line. The last two characters of each line are a carriage return and a line feed. The stations contain a variable number of records for each day. The first record of each day contains date, location, air temperature, UWIND and VWIND, sea surface temperature, and the number of depths. The second and subsequent records contain the depth and the water temperature for that depth. Up to 5 depth/temperature readings are placed in each record.

```
      READ (IUNIT,50) IND,YEAR,MONTH,DAY,LAT,LON,
     *                AIRTEMP,UWIND,VWIND,SSTEMP,TOTDPTHS,CR,LF
      READ (IUNIT,51) (DEPTH(I), TEMP(I), I=1,TOTDPTHS)
   50 FORMAT ('a1',i4,2(1x,i2),3x,f7,2x,f7,
     *         2x,f6,2x,f7,2x,f7,2x,f6,10x,i4,2a1)
   51 FORMAT (A1,7X,5(3X,I4,1X,F6.2),2X)
```

***** FIRST LINE OF EACH DAY *****

Column	Format	Tag	M/V	Comments
1	A1	IND		'D' = First Line of Data
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'_'		
7-8	I2	MONTH		
9	1X	'_'		
10-11	I2	DAY		
12-14	3X			
15-21	F7	LAT		LATITUDE (DEGREES)
22-23	2X			
24-30	F7	LON		LONGITUDE (DEGREES)
31-32	2X			
33-38	F6	AIRTEMP	99.99	AIR TEMPERATURE (°C)

Column	Format	Tag	M/V	Comments
39-40	2X			
41-47	F7	UWIND	999.99	E/W COMPONENT WIND (m s^{-1})
48-49	2X			
50-56	F7	VWIND	999.99	N/S COMPONENT WIND (m s^{-1})
57-58	2X			
59-64	F6	SSTEMP	99.99	SEA SURFACE TEMPERATURE (°C)
65-74	10X			
75-78	I4	TOTDPTHS		NUMBER OF DEPTH MEASUREMENTS
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** SECOND AND SUBSEQUENT LINES (Subsurface data) *****

Column	Format	Tag	M/V	Comments
1	A1	IND		'E' = Additional Line of Data
2-11	10X			
12-15	I4	DEPTH1		DEPTH OF THIS MEASUREMENT (m)
16	1X			
17-22	F6	TEMP1	99.99	WATER TEMPERATURE (°C) AT THIS DEPTH
23-25	3X			
26-29	I4	DEPTH2		DEPTH OF THIS MEASUREMENT (m)
30	1X			
31-36	F6	TEMP2	99.99	WATER TEMPERATURE (°C) AT THIS DEPTH
37-39	3X			
40-43	I4	DEPTH3		DEPTH OF THIS MEASUREMENT (m)
44	1X			
45-50	F6	TEMP3	99.99	WATER TEMPERATURE (°C) AT THIS DEPTH
51-53	3X			
54-57	I4	DEPTH4		DEPTH OF THIS MEASUREMENT (m)
58	1X			
59-64	F6	TEMP4	99.99	WATER TEMPERATURE (°C) AT THIS DEPTH
65-67	3X			
68-71	I4	DEPTH5		DEPTH OF THIS MEASUREMENT (m)
72	1X			
73-78	F6	TEMP5	99.99	WATER TEMPERATURE (°C) AT THIS DEPTH
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** DATA FORMAT EXAMPLE *****

***** File A02N110W.DAT *****

```
D1985-06-01      2.000  250.000    99.99    999.9    999.9    99.99               10
E           20  24.88      40  99.99     60  16.41      80  99.99    100  14.10
E          120  99.99     140  13.61    180  13.23     300  11.62    500  99.99
D1985-06-02      2.000  250.000    99.99    999.9    999.9    99.99               10
E           20  24.72      40  99.99     60  16.78      80  99.99    100  14.18
E          120  99.99     140  13.66    180  13.24     300  11.67    500  99.99
D1985-06-03      2.000  250.000    99.99    999.9    999.9    99.99               10
E           20  24.58      40  99.99     60  19.68      80  99.99    100  14.45
E          120  99.99     140  13.72    180  13.29     300  12.02    500  99.99
```

10   PMEL ISLAND DATA

This data set contains daily averaged meteorological measurements from three island stations: Baker Island (0.2°N, 177.5°W), Nauru Island (0.5°S, 167.9°E) and Christmas Island (2.0°N, 157.5°W).

These data are found on the CD-ROM in the root directory PMELISLE (section 3).

A single tape containing 59 files, which included both the moored buoy data and the island data, was received. The moored buoy data are discussed in Section 8.   The tape is 9-track, unlabeled, 6250 bpi, ASCII, 50-byte record size, and 5000-byte block size.

The data format is 80 characters per line. The last two characters of each line are a carriage return and a line feed. The stations contain one record per day. Each record contains date, UWIND and VWIND, air temperature, and air pressure.

```
      READ (IUNIT,50) IND,YEAR,MONTH,DAY,HOUR,MIN,
    *                 UWIND,VWIND,AIRTEMP,AIRPRESS,CR,LF
   50 FORMAT (a1,i4,4(1x,i2),1x,4(1x,f8.2),24x,2a1)
```

Column	Format	Tag	M/V	Comments
1	A1	IND		'D'
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9	1X	'-'		
10-11	I2	DAY		
12	1X			
13-14	I2	HOUR		
15	1X	':'		
16-17	I2	MIN		BEGINNING OF 24-HOUR AVERAGING INTERVAL
18	1X			
19	1X			
20-27	F8	UWIND	-999.99	E/W COMPONENT WIND (m s^{-1})
28	1X			
29-36	F8	VWIND	-999.99	N/S COMPONENT WIND (m s^{-1})
37	1X			
38-45	F8	AIRTEMP	-99.99	AIR TEMPERATURE (°C)
46	1X			
47-54	F8	AIRPRESS	-999.99	AIR PRESSURE (hPa)
55-78	24X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** DATA FORMAT EXAMPLE *****

```
***** File NAURU.DAT *****
D1986-01-01 00:00    -1.12     1.35  -999.99   -999.99
D1986-01-02 00:00    -0.91    -0.95  -999.99   -999.99
D1986-01-03 00:00     0.78    -0.24    23.83   1004.75
D1986-01-04 00:00    -1.14    -2.25    26.81   1004.27
D1986-01-05 00:00    -1.04    -1.37    26.21   1004.49
D1986-01-06 00:00    -4.61    -1.56    25.36   1004.66
D1986-01-07 00:00    -5.22    -1.33    27.90   1004.40
```

11   IFREMER SHIP (SUBSURFACE) DATA

This data set contains 48,059 temperature profiles processed at the TOGA Subsurface Data Center.

These data are found on the CD-ROM in the root directory IFREMER (section 3). Each subdirectory contains up to 24 monthly files. The data distribution is described in Table 7.

Table 7.   IFREMER Subsurface Data Inventory

Year	BATHY Message	TESAC	XBT	SONDE and NANSEN	Real-time Data	Delayed Data	Total
Atlantic Ocean							
1985	1735	63	3927	938	1798	4865	6663
1986	1742	435	2963	187	2177	3150	5327
Indian Ocean							
1985	1657	454	2435	99	2111	2534	4645
1986	815	386	2325	0	1201	2325	3526
Pacific Ocean							
1985	2238	792	10927	66	3030	10993	14023
1986	3073	778	10754	75	3851	10829	14680

A single tape of 1985-1986 data was received. The tape is in TOGA Subsurface Data Center (TSDC) format, 9-track, unlabeled ASCII, 80-byte record size, and 4000-byte block size.

The IFREMER subsurface temperature format is 80 characters per line. The last two characters of each line are a carriage return and a line feed. The IFREMER files contain a variable number of records for each location. The first record of each set contains date, time, location, ship ID, data quality indicator flags, thermocline depth (defined as the mean depth of the maximum temperature gradient computed over 10 m), salinity, salinity flag, maximum depth measured, and the number of depth measurements included. Surface salinity occurs only in a TESAC profile. The second and subsequent records contain the depth, the water temperature for that depth, and data quality flags for the depth and temperature. Up to 5 depth/temperature/flag readings are placed in each record. Within each daily file, data are ordered by time.

```
        READ (IUNIT,50)  IND,YEAR,MONTH,DAY,HOUR,MIN,LAT,LON,
        *                SHIPID,PROFLG,POSFLG,DATFLG,THDPTH,
        *                SALIN,SALFLAG,MAXDPTH,NDPTHS,CR,LF
        READ (IUNIT,51)  ((DEPTH(i),TEMP(i),
        *                DPTFLG(i),TEMFLG(i)),i=1,NDPTHS)
     50 FORMAT ('al',i4,4(1x,i2),1x,f7,1x,f7,
        *          1X,A8,1X,3I1,1X,I4,
        *          1X,F5,1X,I1,1X,I4,1X,I3,10X,2a1)
     51 FORMAT (3X,5(2X,I4,1X,F5,1X,2I1),2x)
```

24

```
***** FIRST LINE OF EACH SET *****

Column     Format        Tag         M/V          Comments

1          A1            IND                      'D' = First Line of Data
2-5        I4            YEAR                     DATE AND TIME ARE GMT
6          1X            '-'
7-8        I2            MONTH
9          1X            '-'
10-11      I2            DAY
12         1X
13-14      I2            HOUR
15         1X            ':'
16-17      I2            MIN
18         1X
19-25      F7            LAT                      LATITUDE (DEGREES)
26         1X
27-33      F7            LON                      LONGITUDE (DEGREES)
34         1X
35-42      A8            SHIPID                   SHIP CALL SIGN
43         1X
44         I1            PROFLG                   PROFILE QUALITY FLAG
45         I1            POSFLG                   POSITION QUALITY FLAG
46         I1            DATFLG                   DATE QUALITY FLAG
47         1X
48-51      I4            THDPTH                   THERMOCLINE DEPTH (m)
52         1X
53-57      F5            SALIN         0.0        SURFACE SALINITY (PER MILLE)
58         1X
59         I1            SALFLAG                  SALINITY FLAG
60         1X
61-64      I4            MAXDPTH                  MAXIMUM DEPTH (m)
65         1X
66-68      I3            NDPTHS                   NUMBER OF DEPTHS RECORDED
69-78      10X
79         A1            CR                       Carriage Return (0D hex)
80         A1            LF                       Line Feed       (0A hex)

***** SECOND AND SUBSEQUENT LINES (Subsurface data) *****

Column     Format        Tag         M/V          Comments

1          1X            'E'                      'E' = Additional Line of Data
2-3        2X
4-5        2X
6-9        I4            DEPTH1                   DEPTH (m)
11         1X
11-15      F5            TEMP1                    TEMPERATURE (°C)
16         1X
17         I1            DPTFLG1                  DEPTH QUALITY FLAG
18         I1            TEMFLG1                  TEMPERATURE QUALITY FLAG
19-20      2X
21-24      I4            DEPTH2                   DEPTH (m)
25         1X
26-30      F5            TEMP2                    TEMPERATURE (°C)
31         1X
32         I1            DPTFLG2                  DEPTH QUALITY FLAG
33         I1            TEMFLG2                  TEMPERATURE QUALITY FLAG
```

Column	Format	Tag	M/V	Comments
34-35	2X			
36-39	I4	DEPTH3		DEPTH (m)
40	1X			
41-45	F5	TEMP3		TEMPERATURE (°C)
46	1X			
47	I1	DPTFLG3		DEPTH QUALITY FLAG
48	I1	TEMFLG3		TEMPERATURE QUALITY FLAG
49-50	2X			
51-54	I4	DEPTH4		DEPTH (m)
55	1X			
56-60	F5	TEMP4		TEMPERATURE (°C)
61	1X			
62	I1	DPTFLG4		DEPTH QUALITY FLAG
63	I1	TEMFLG4		TEMPERATURE QUALITY FLAG
64-65	2X			
66-69	I4	DEPTH5		DEPTH (m)
70	1X			
71-75	F5	TEMP5		TEMPERATURE (°C)
76	1X			
77	I1	DPTFLG5		DEPTH QUALITY FLAG
78	I1	TEMFLG5		TEMPERATURE QUALITY FLAG
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

Flags are: (1) 0, profile was not checked at TSDC; (2) 1, profile passed the first version of the TSDC quality control; (3) 3, doubtful profile (e.g., temperature inversions); (4) 4, erroneous profile (e.g., temperature increases at the bottom of the profile); and (5) 5, large error in data or position which can be corrected (e.g., hemisphere change).

***** DATA FORMAT EXAMPLE *****

***** File B8501.DAT *****
```
D1985-01-01  4:35  25.000 207.000 DHCW      111  240  0.00 0   450  13
E         0 23.30 11      75 23.30 11      78 23.00 11      88 21.00 11   100 20.20 11
E       108 20.00 11     150 18.10 11     172 16.60 11     180 16.60 11   250 13.30 11
E       300 11.60 11     400  9.30 11     450  8.30 11
D1985-01-01 10:18  28.000 142.000 UHQS      111   84  0.00 0   102   5
E         0 20.20 11      75 20.20 11      90 19.30 11      94 18.70 11   102 18.50 11
D1985-01-01 11:00  26.000 233.000 NLVS      111  190  0.00 0   450  16
E         0 18.70 11      55 18.70 11      60 19.00 11     110 19.00 11   130 18.00 11
E       141 17.00 11     169 15.50 11     180 13.00 11     212 11.00 11   235 10.00 11
E       260  9.00 11     300  8.50 11     350  7.50 11     400  7.40 11   425  7.20 11
E       450  6.90 11
```

12   ECMWF SURFACE METEOROLOGICAL FIELDS

The European Center for Medium Range Weather Forecasting provided two classes of data for the CD-ROM: basic level III analyzed data and supplementary field data. ECMWF data are supplied on the CD-ROM subject to the following conditions:

1. The supplied data will not be transmitted in whole or in part to any third party without the authorization of ECMWF.

2. Articles, papers, or written scientific works of any form, based in whole or in part on data supplied by ECMWF, will contain an acknowledgement concerning the supplied data.

3. Access to the data is restricted to the scientists within the organization of the data recipient working on the same computer installation.

4. The recipient of the data will accept responsibility for informing all data users of these conditions.

5. Data will not be provided to commercial organizations.

Four unlabeled tapes containing ECMWF surface meteorological data were received.

The ECMWF format is described in the FM 92 GRIB document (ECMWF, 1988). ECMWF variables contained on the CD-ROM are listed in Table 8. The following variables are not included on the TOGA CD-ROM: surface geopotential, net shortwave and longwave radiations at the top of the atmosphere.

All ECMWF data on the TOGA CD-ROM are on a global 2.5° × 2.5° grid. There are 144 points from east to west, starting at 0° and increasing eastward in 2.5° increments to 357.5°. There are 73 sets of values from north to south starting at 90°N. Each global grid file contains 21120 bytes.

Table 8.   ECMWF Variables Contained on the CD-ROM. Sensible and Latent Surface Heat Fluxes and X- and Y-Components of Surface Wind Stress Values on the CD-ROM Are Integrated Values Over 6 Hours; However, the EXTRACT Program Yields 6-hour Averaged Values.

Field Name	Unit	CD-ROM Abbreviation
SURFACE TEMPERATURE	°C	SSTEMP
SENSIBLE HEAT FLUX		
Integrated Over 6 Hours	W m^{-2}	SENSHEAT
LATENT HEAT FLUX		
Integrated Over 6 Hours	W m^{-2}	LATHEAT
SEA LEVEL PRESSURE	hPa	AIRPRESS
U-COMPONENT WIND AT 10 m	m s^{-1}	UWIND
V-COMPONENT WIND AT 10 m	m s^{-1}	VWIND
TEMPERATURE AT 2 m	°C	AIRTEMP
DEWPOINT AT 2 m	°C	DEWPOINT
U-COMPONENT WIND STRESS		
Integrated Over 6 Hours	N m^{-2}	TAUX
V-COMPONENT WIND STRESS		
Integrated Over 6 Hours	N m^{-2}	TAUY

Utilities to read, unpack and subset the ECMWF fields are found in the SOFTWARE directory on the CD-ROM (section 4).

There are 14,600 ECMWF files on the CD-ROM, and a very small number of these files contain zero for each value or no data exist in the file. AIRPRESS, AIRTEMP, DEWPOINT, SSTEMP, UWIND, and VWIND files containing zero values are 850423C, 850424C, 850430A, 850614A, and 850614C. LATHEAT,

SENSHEAT, TAUX, and TAUY files with zero values are 850423B, 850424B, 850429D, and 851231D. LATHEAT, SENSHEAT, TAUX, and TAUY files without data are 850613D, 850614B, and 861231D. Time periods associated with these data anomalies are 23-24 April 1985, 29-30 April 1985, and 13-14 June 1985.

13   CAC SEA SURFACE TEMPERATURE FIELD

    These monthly sea surface temperature fields on a 2° × 2° grid for the years 1985 and 1986 are produced by NOAA's Climate Analysis Center from a blend of in situ data, AVHRR satellite data, and ice data (Reynolds, 1988).

    These data are found on the CD-ROM in the root directory CAC (section 3). There are 12 monthly files of analyzed data for 1985 and 12 for 1986. Also, there are 12 climatological-mean (1950-1979) monthly files.

    A single tape with four multiyear (1970-1988) files was received. The tape is 9-track, unlabeled, blocked, ASCII, with an 80-byte record size.

    The CAC SSTEMP formats are 80 characters per line. The last two characters of each line are a carriage return and a line feed. The location of each value is defined by the I index for longitude and the J index for latitude. For I=1, the grid is centered at 0°, I=2 at 2°E, and so on eastward to I=180 at 2°W (358°E). For J=1, the grid is centered at 90.0N, J=2 at 88°N, and so on southward to J=91 at 90°.

    A utility to read and subset the CAC SSTEMP fields is in the SOFTWARE directory on the CD-ROM (section 4).

```
      REAL    SSTEMP(180,91)
      INTEGER IFLAG(180,91)
      READ (iunit,80) YEAR,MONTH,STLAT,NLATS,LATRES,STLON,
     *          NLONS,LONRES,PNAME,CR,LF
      READ (iunit,81) (( SSTEMP(I,J),I=1,180),J=1,91)
      READ (iunit,82) ((IFLAG(I,J),I=1,180),J=1,91)
  80 FORMAT 1(X,i4,1X,I2,1X,2(1X,f7.3,1X,I4,1X,F4.1,1X),
     *          A30,1X,2a1)
  81 FORMAT (13F6,2x)
  82 FORMAT (78I1,2x)
```

***** FIRST LINE *****

Column	Format	Tag	M/V	Comments
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'_'		
7-8	I2	MONTH		
9	1X			
10	1X			
11-17	F7.3	STLAT		NORTHERN LATITUDE (DEGREES)
18	1X			
19-22	I4	NLATS		NUMBER OF LATITUDINAL ROWS
23	1X			
24-27	F4.1	LATRES		LATITUDE RESOLUTION (DEGREES)
28	1X			
29	1X			
30-36	F7.3	STLON		WESTERN LONGITUDE (DEGREES)
37	1X			

Column	Format	Tag	M/V	Comments
38-41	I4	NLONS		NUMBER OF LONGITUDINAL COLUMNS
42	1X			
43-46	F4.1	LONRES		LONGITUDE RESOLUTION (DEGREES)
47	1X			
48-77	A30	PNAME		PARAMETER NAME (ANALYZED SEA SURFACE TEMPERATURE, SEA SURFACE TEMPERATURE CLIMATOLOGY)
78	1X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE 2 THRU N (END OF SSTEMP ARRAY) *****

Column	Format	Tag	M/V	Comments
1-78	13F6.2	SSTEMP		SEA SURFACE TEMPERATURE (°C)
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE N+1 THRU END OF IFLAG ARRAY *****

Column	Format	Tag	M/V	Comments
1-78	78I1	IFLAG		FLAG FOR RESPECTIVE GRID POINTS
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

The IFLAG array for the monthly analyzed SSTEMP is: (1) IFLAG = 0, blended value is anchored by satellite analysis and there are at least 10 satellite observations per month; (2) IFLAG = 1, blended value is anchored by the in situ analysis and there are at least 5 in situ observations per month; (3) IFLAG = 3, SSTEMP mean is set to -1.8°C; (4) IFLAG = 4, blended value is anchored by the freezing point of sea water (-1.8°C); (5) IFLAG = 5, blended value is determined by relaxation of the in situ analysis when the number of satellite observations is more than 10 per month; and (6) IFLAG = 6, blended value is determined by relaxation of the in situ analysis when the number of satellite observations is less than 10 per month.

The IFLAG values for the sea surface temperature climatology files are: (1) IFLAG = 1, value based on 10 or more ship or buoy observations in the grid square from COADS 1950-1979; (2) IFLAG = 2, value set to -1.8°C; and (3) IFLAG = 5, value based on satellite data for the period 1982-1985.

***** DATA FORMAT EXAMPLE *****

***** File ANAL8501.DAT *****
1985-01 90.000   91 2.0   0.000 180 2.0 Analyzed Sea Surface Temp.
-1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
-1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
-1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
-1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
.........................1260 lines of SSTEMP array.....................
....
33333333333333333333333333333333333333333333333333333333333333333333333333333
33333333333333333333333333333333333333333333333333333333333333333333333333333
33333333333333333333333334444444444444444444444444444444444444444444444444444

```
44444444444444444444444444444444444444444444444444444444444444444444444444444444
.........................210 lines of IFLAG array......................
................................................................................
```

        In the following example of a monthly climatological SSTEMP field, note
that the date field is given as 1900. The climatology is from 1950-1979.

```
     ***** File CLIM01C.DAT *****
     1900-01   90.000    91  2.0     0.000  180  2.0 Sea Surface Temp. Climatology
     -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
     -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
     -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
     -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80
     ........................1260 lines of SSTEMP array......................
     ................................................................................
     22222222222222222222222222222222222222222222222222222222222222222222222222222222
     22222222222222222222222222222222222222222222222222222222222222222222222222222222
     22222222222222222222222222222222222222222222222222222222222222222222222222222222
     22222222222222222222222222222222222222222222222222222222222222222222222222222222
     .........................210 lines of IFLAG array......................
     ................................................................................
```

14   FSU SURFACE PSEUDO-STRESS FIELD

        Ship reports of surface winds are converted to pseudo-stress components,
which are defined to be the magnitude of the wind vector multiplied by the
Cartesian wind speed (Legler et al., 1989). The direction of the pseudo-
stress is defined to be the direction towards which the wind is blowing.
East-west and north-south components of the pseudo-stress are defined by TAUX
(positive toward the east) and TAUY (positive toward the north), respectively.

        In the case of the Pacific Ocean, pseudo-stresses are binned into 10°-
longitude × 2°-latitude regions, subjectively analyzed, and digitized on a 2°
× 2° grid. In the case of the Indian Ocean the bin size is 1° × 1°. Monthly
climatological averages are given for the Pacific Ocean for the 1966-1985
period; for the Indian Ocean the interval is 1977-1988. [NOTE ADDED IN PROOF:
Climatological-mean monthly data are not contained on the CD-ROM. Pseudo-
stress climatologies for the Indian and Pacific are available from
Professor O'Brien (Table 2).]

        These data are found on the CD-ROM in the root directory FSU (section
3).

        A utility to read and subset the FSU pseudo-stress fields is in the
SOFTWARE directory on the CD-ROM (section 4).

14.1 Pacific Ocean

        The FSU Pacific Ocean pseudo-stress data and climatological data formats
are 80 characters per line. The last two characters of each line are a
carriage return and a line feed. Values of 999.0 are over land. The data are
on a 2° × 2° grid, and there are 84 points east-to-west and 30 points north-
to-south. The location of each value is defined by the I index for longitude
and the J index for latitude. For I=1, the grid is centered at 124°E, I=2 at
126°E, and so on eastward to I=84 at 290° (70°W). For J=1, the grid is

centered at 29°N, J=2 at 27°N and so on southward to J=30 at 29°S. Examples
of the data array are: TAUX (1, 1) and TAUY (1, 1) are centered at 124°E and
29°N; and TAUX (2, 1) and TAUY (2, 1) are centered at 126°E and 29°N.

```
      real      TAUX(84,30),   TAUY(84,30)
      READ (iunit,80) YEAR,IMO,SLAT,NLATS,LATRES,
     *                          STLON,NLONS,LONRES,PNAME,CR,LF
      READ (iunit,81) ((TAUX(I,J),I=1,84),J=1,30)
      READ (iunit,81) ((TAUY(I,J),I=1,84),J=1,30)
   80 FORMAT (1x,i4,1x,i2,2(2x,f7.3,1x,i4,1x,f4.1),1x,a30,1x,2a1)
   81 FORMAT (10f7.1,10x)
```

***** FIRST LINE *****

Column	Format	Tag	M/V	Comments
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9-10	2X			
11-17	F7.3	STLAT		NORTHERN LATITUDE (DEGREES)
18	1X			
19-22	I4	NLATS		NUMBER OF LATITUDINAL ROWS
23	1X			
24-27	F4.1	LATRES		LATITUDE RESOLUTION (DEGREES)
28-29	2X			
30-36	F7.3	STLON		WESTERN LONGITUDE (DEGREES)
37	1X			
38-41	I4	NLONS		NUMBER OF LONGITUDINAL COLUMNS
42	1X			
43-46	F4.1	LONRES		LONGITUDE RESOLUTION (DEGREES)
47	1X			
48-77	A30	PNAME		PARAMETER NAME (PACIFIC PSEUDO-STRESS, PACIFIC PSEUDO-STRESS CLIMATOLOGY)
78	1X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE 2 THRU 253 (END OF TAUX ARRAY) *****

Column	Format	Tag	M/V	Comments
1-70	10F7.1	TAUX		X-COMPONENT PSEUDO-STRESS (m s^{-2})
71-78	8X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE 254 THRU 505 (END OF TAUY ARRAY) *****

Column	Format	Tag	M/V	Comments
1-70	10F7.1	TAUX		X-COMPONENT PSEUDO-STRESS (m s^{-2})
71-78	8X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

```
***** DATA FORMAT EXAMPLE *****

***** File PAC8501.DAT *****
 1985-01   29.000    30  2.0  124.000    84  2.0 Pacific  pseudo-stress
  -20.0  -20.0  -14.0    0.0    6.6   20.0   30.0   40.0   40.0   53.3
   52.0   51.7   50.0   50.0   50.0   40.0   40.0   40.0   40.0   45.0
   47.8   46.6   50.0   60.0   70.0   87.1   86.6   88.0   85.0   90.0
   86.6   85.0   85.0   79.9   74.9   69.9   65.0   60.0   50.0   40.0
........................252 lines of TAUX array........................
........................................................................
  -65.0  -65.0  -65.0  -50.0  -45.0  -40.0  -40.0  -40.0  -38.3  -36.6
  -34.9  -33.3  -31.6  -30.0  -27.5  -25.0  -22.5  -20.0  -15.0  -10.0
   -6.6   -3.3    0.0    0.0    0.0    0.0    5.0   10.0    6.6   11.6
   20.0   12.0    8.0   10.0    4.0   -2.0    0.0    0.0    5.0   10.0
........................252 lines of TAUY array........................
........................................................................
```

14.2   Indian Ocean

The FSU Indian Ocean pseudo-stress data and climatological data formats
are 80 characters per line. The last two characters of each line are a
carriage return and a line feed. Values of 999.0 are over land. The data are
on a 1° × 1° grid, and there are 90 points east-to-west and 54 points north-
to-south.

The location of each value is defined by the I index for longitude and
the J index for latitude. For I=1, the grid is centered at 30.5°E, I=2 at
31.5°E, and so on eastward to I=90 at 119.5°E. For J=1, the grid is centered
at 24.5°N, J=2 at 23.5°N, and so on southward to J=54 at 29.5°S. Examples of
the data array are: TAUX (1, 1) and TAUY (1, 1) are centered at 30.5°E and
24.5°N; and TAUX (2, 1) and TAUY (2, 1) are centered at 31.5°E and 24.5°N.

```
      real     TAUX(90,54),  TAUY(90,54)
      READ (iunit,80) YEAR,IMO,SLAT,NLATS,LATRES,
     *                     SLON,NLONS,LONRES,PNAME,CR,LF
      READ (iunit,81) ((TAUX(I,J),I=1,90),J=1,54)
      READ (iunit,81) ((TAUY(I,J),I=1,90),J=1,54)
   80 FORMAT (1x,i4,1x,i2,2(2x,f7.3,1x,i4,1x,f4.1),1x,a30,1x,2a1)
   81 FORMAT (10f7.1,10x)
```

***** FIRST LINE *****

Column	Format	Tag	M/V	Comments
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9-10	2X			
11-17	F7.3	STLAT		NORTHERN LATITUDE (DEGREES)
18	1X			
19-22	I4	NLATS		NUMBER OF LATITUDINAL ROWS
23	1X			
24-27	F4.1	LATRES		LATITUDE RESOLUTION (DEGREES)
28-29	2X			
30-36	F7.3	STLON		WESTERN LONGITUDE (DEGREES)
37	1X			

Column	Format	Tag	M/V	Comments
38-41	I4	NLONS		NUMBER OF LONGITUDINAL COLUMNS
42	1X			
43-46	F4.1	LONRES		LONGITUDE RESOLUTION (DEGREES)
47	1X			
48-77	A30	PNAME		PARAMETER NAME (INDIAN PSEUDO-STRESS, INDIAN PSEUDO-STRESS CLIMATOLOGY)
78	1X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE 2 THRU 487 (END OF TAUX ARRAY) *****

Column	Format	Tag	M/V	Comments
1-70	10F7.1	TAUX		X-COMPONENT PSEUDO-STRESS (m s^{-2})
71-78	8X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** LINE 488 THRU 973 (END OF TAUY ARRAY) *****

Column	Format	Tag	M/V	Comments
1-70	10F7.1	TAUY		Y-COMPONENT PSEUDO-STRESS (m s^{-2})
71-78	8X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

***** DATA FORMAT EXAMPLE *****

***** File IND8501.DAT *****
```
1985-01   23.500   54  1.0   30.500   90  1.0 Indian  pseudo-stress
  999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0
  999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0
  999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0  -18.7   -12.1
   -6.7   -11.2    -4.1    -7.4   -10.3   -10.5    -9.5    -3.7   999.0   999.0
....................................486 lines of TAUX array..........................
..........................................................................................
  999.0   999.0   999.0   999.0   -40.4   -31.4   -24.1   -21.9   -20.3   -19.2
  -18.6   -17.6   -16.9   -15.6   -15.3   -16.6   -15.7   -14.8   -11.6    -8.1
   -5.0     0.1   999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0
  999.0   999.0   -14.7   -15.3   -18.1   -17.4   -20.0   -20.5   -21.5   -21.0
....................................486 lines of TAUY array..........................
..........................................................................................
```

15   ORSTOM SURFACE PSEUDO-STRESS FIELD

These data are gridded monthly fields of the east-west (TAUX, positive eastward) and north-south (TAUY, positive northward) components of pseudo-stress for the tropical Atlantic Ocean (Picaut et al., 1985). Wind vector data are converted to pseudo-stress vectors by multiplying the wind components by the wind magnitude. The direction of the pseudo-stress is defined to be the direction toward which the wind is blowing.

The pseudo-stress vectors are binned into 2°-latitude × 5°-longitude boxes. The spatial limits of the data are 29°N to 19°S and 59°W to 15°E. There are 38 points from east to west indexed by I, where I=1 corresponds to 301°E (i. e., 59°W), I=2 to 303°E (i. e., 57°W), and so on, eastward to I=38 at 15°E. There are 25 points from north to south indexed by J, where J=1 corresponds to 29°N, J=2 to 27°N, and so on, southward to J=25 at 19°S. Land values are set to 999.0.

These data are found on the CD-ROM in the root directory ORSTOM (section 3). There are two types of data files. There are 12 files containing climatological-mean monthly data for the years 1964-1985. These files are named according to the month. The second type of file in this directory contains the monthly mean analysis for the years 1985 and 1986 (24 files).

A single tape containing 10 files was received. The tape is 9-track, unlabeled, ASCII, 65-byte record size, and 2600-byte block size.

The ORSTOM Atlantic Ocean pseudo-stress data format is 80 characters per line. The last two characters of each line are a carriage return and a line feed.

A utility to read and subset the ORSTOM pseudo-stress fields is in the SOFTWARE directory on the CD-ROM (section 4).

```
      real      TAUX(38,25),  TAUY(38,25)
      READ (iunit,80) YEAR,IMO,SLAT,NLATS,LATRES,
     *                        SLON,NLONS,LONRES,PNAME,CR,LF
      READ (iunit,81) ((TAUX(I,J),I=1,38),J=1,25)
      READ (iunit,81) ((TAUY(I,J),I=1,38),J=1,25)
   80 FORMAT (1x,i4,1x,i2,2(2x,f7.3,1x,i4,1x,f4.1),1x,a30,1x,2a1)
   81 FORMAT (10f7.1,10x)
```

***** FIRST LINE *****

Column	Format	Tag	M/V	Comments
1	1X			
2-5	I4	YEAR		DATE AND TIME ARE GMT
6	1X	'-'		
7-8	I2	MONTH		
9-10	2X			
11-17	F7.3	STLAT		NORTHERN LATITUDE (DEGREES)
18	1X			
19-22	I4	NLATS		NUMBER OF LATITUDINAL ROWS
23	1X			
24-27	F4.1	LATRES		LATITUDE RESOLUTION (DEGREES)
28-29	2X			
30-36	F7.3	STLON		WESTERN LONGITUDE (DEGREES)
37	1X			
38-41	I4	NLONS		NUMBER OF LONGITUDINAL COLUMNS
42	1X			
43-46	F4.1	LONRES		LONGITUDE RESOLUTION (DEGREES)
47	1X			
48-77	A30	PNAME		PARAMETER NAME (ATLANTIC PSEUDO-STRESS, ATLANTIC PSEUDO-STRESS CLIMATOLOGY)
78	1X			
79	A1	CR		Carriage Return (0D hex)
80	A1	LF		Line Feed (0A hex)

```
***** LINE 2 THRU 96 (END OF TAUX ARRAY) *****

Column    Format       Tag        M/V              Comments

1-70      10F7.1       TAUX                 X-COMPONENT PSEUDO-STRESS (m s⁻²)
71-78     8X
79        A1           CR                   Carriage Return (0D hex)
80        A1           LF                   Line Feed       (0A hex)

***** LINE 97 THRU 191 (END OF TAUY ARRAY) *****

Column    Format       Tag        M/V              Comments

1-70      10F7.1       TAUY                 Y-COMPONENT PSEUDO-STRESS (m s⁻²)
71-78     8X
79        A1           CR                   Carriage Return (0D hex)
80        A1           LF                   Line Feed       (0A hex)


***** DATA FORMAT EXAMPLE *****

***** File ATL8501.DAT *****
1985-01   29.000    25  2.0  301.000    38  2.0 Atlantic pseudo-stress
   51.3    43.8    39.6    37.9    36.2    34.0    31.5    28.2    24.5    21.3
   19.0    17.8    15.0    13.7    11.1     9.4     8.7     8.3     7.0     3.7
    0.3    -0.2     1.2     3.6   999.0   999.0   999.0   999.0   999.0   999.0
  999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0    31.1    28.0
............................95 lines of TAUX array..........................
............................................................................
   18.6    16.8    16.0    15.7    14.9    13.8    11.3     9.9    13.3    16.9
   21.7    25.3    26.2    27.6    24.7    19.4     7.0    -3.2   -12.2   -20.5
  -25.2   -20.8   -16.2   -13.6   999.0   999.0   999.0   999.0   999.0   999.0
  999.0   999.0   999.0   999.0   999.0   999.0   999.0   999.0     9.8     9.0
............................95 lines of TAUY array..........................
............................................................................
```

AIRPRESS	Air pressure near the sea surface
AIRTEMP	Air temperature
ASCII	American standard code for information exchange
AVHRR	Advanced Very High Resolution Radiometer
BATHY	Bathymessage
CAC	Climate Analysis Center
CD-ROM	Compact disk - read only memory
COADS	Comprehensive Ocean Atmosphere Data Set
CR	Carriage return
DATFLG	Data quality flag
DEC	Digital Equipment Corporation
DEWPOINT	Dew point temperature
DRDPTH	Drogue depth
EBCDIC	Extended binary-coded decimal interchange code
ECMWF	European Center for Medium Range Weather Forecasting
EGA	Extended graphics adaptor
FM 92 GRIB	Format grid in binary
FSU	Florida State University
GF3	General Format 3
GLOSS	Global Sea Level Observing System
GMT	Greenwich Mean Time
HFS	Hierarchical File System
IBM PC	International Business Machines Personal Computer
IFREMER	Institut Français de Recherche Pour L'exploitation de la Mer
IGOSS	Integrated Global Ocean Service System
IMMT	International Maritime Meteorological Tape
ISO	International Organization for Standardization
JPL	Jet Propulsion Laboratory
KB	Kilobytes
LAT	Latitude
LATHEAT	Latent heat flux at the sea surface
LATRES	Latitude resolution
LF	Line feed
LON	Longitude
LONRES	Longitude resolution
MAXDPTH	Maximum depth
MB	Megabytes
MEDS	Marine Environmental Data Service
MS DOS	Microsoft disk operating system
M/V	Missing Value
NANSEN	Nansen cast
NASA	National Aeronautics and Space Administration
NLATS	Number of latitudinal rows
NLONS	Number of longitudinal rows
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NWLAT	Latitude of the northwest corner
NWLON	Longitude of the northwest corner
ORSTOM	Institut Français de Recherche Scientifique Pour le Développement en Cooperation
PI	3.14159
PMEL	Pacific Marine Environmental Laboratory
PMELCURR	Directory on CD-ROM where PMEL moored current data are found

PMELISLE	Directory on CD-ROM where PMEL island data are found
PMELTEMP	Directory on CD-ROM where PMEL moored temperature data are found
PNAME	Parameter name
POSFLG	Position quality flag
PRC	People's Republic of China
PROFLG	Profile quality flag
RAM	Random access memory
SALIN	Surface salinity
SEALEV	Sea level
SELAT	Latitude of the southeast corner
SELON	Longitude of the southeast corner
SENSHEAT	Sensible heat flux at the sea surface
SHIPID	Ship call sign
SONDE	Conductivity-temperature-depth/salinity-temperature-depth (CTD/STD)
SSTEMP	Sea surface temperature
STATNAME	Station name
STLAT	Northern latitude
STLON	Western longitude
SUBTEMP	Subsurface temperature
TAUX	East-west component of surface wind stress (ECMWF) East-west component of pseudo-stress at the sea surface (FSU, ORSTOM)
TAUY	North-south component of surface wind stress (ECMWF) North-south component of pseudo-stress at the sea surface (FSU, ORSTOM)
TESAC	Real time (IGOSS) temperature and salinity profile
THDPTH	Thermocline depth
TOGA	Tropical Ocean Global Atmosphere
TOTDPTHS	Number of depth measurements
TSDC	TOGA Subsurface Data Center
UKMO	United Kingdom Meteorological Office
UHAWAII	Directory on CD-ROM where University of Hawaii sea level data are found
UNIX	An operating software system developed by Bell Laboratories
UOCN	East-west component of current
US	United States
UWIND	East-west component of wind
VMS	Virtual memory operating system
VOCN	North-south component of current
VWIND	North-south component of wind
WBDEW	Wetbulb or dewpoint temperature
WBIND	Wetbulb or dewpoint indicator
WCRP	World Climate Research Program
WDIR	Wind direction
WMO	World Meteorological Organization
WSPD	Wind speed
WTEMP	Water temperature
XBT	Expendable bathythermograph

17   REFERENCES

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Wyrtki, K., Caldwell, P., Constantine, K., Kilonsky, B. J., Mitchum, G. Miyamoto, B., Murphy, T., and Nakahara, S. (1988) The Pacific Island Sea Level Network. JIMAR No. 88-0137, University of Hawaii, Honolulu, 71 pp.

Appendix A: TOGA CD-ROM Application Software Description

    The application software, which is applicable for an IBM PC or compatible, is a set of menu-driven utilities to extract data from the TOGA CD-ROM. The software consists of two types of files: binary executable images and ASCII working files. These files are contained on three 5.25-inch diskettes in the directory :\TOGA. Copy the contents of these diskettes to a hard disk by inserting them, one at a time, in the A: drive and typing XCOPY A: C: \S. This creates the directory called C:\TOGA on the hard disk and copies all subdirectories and files to this directory. The total amount of disk space necessary is about 2.4 MB. To run the program type CD TOGA, then TOGAMAIN.

    Users may select individual files or perform a search of selected lists of data sets based on temporal and/or geographical constraints. Once selected, files may be viewed graphically or transferred to a user's database.

    The Main Menu contains the following options: (1) Select Data Set(s) and File(s); (2) Display/Graph Data; (3) Load/Constrain Files List; (4) Browse/Print Snapshot Files; and (5) Exit to DOS. Press <F9> from within any option for function key definitions.

    The Select Data Set(s) and File(s) option present the user with five windows. The large window on the left contains a list of the TOGA CD-ROM data set directories through which one may browse by using the cursor keys to highlight the directories. A directory corresponding to one of the TOGA data sets may be chosen by pressing <Enter> when a directory name is highlighted. After a data set directory has been chosen, a list of the files appears. As the cursor highlights each file, a list of the parameters contained in that file is displayed in the window titled Physical Parameters. The temporal and geographic limits are displayed in the Default Constraints window.

    Individual files are selected by pressing either <Enter> or <Space Bar> while the file is highlighted. Upon exiting the subdirectory, the user's list of selected files is saved to a temporary list in memory. If a subdirectory is re-entered after previously selecting files and exiting, the temporary list of files in memory is still active. The maximum number of files that may be passed to the display module is 100.

    The list of selected files, which must be less than 100, may also be saved to disk by pressing <F5> and entering a filename. Multiple lists may be saved in this fashion and then later reloaded by using the Load/Constrain Files List option.

    The Status window accepts user input, such as desired filenames and whether to save lists of selected files.

    The bottom window is a menu of the available functions assigned to each of the function keys (Table A-1).

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Table A-1. Function Key Definitions for the Select Data Set(s) and File(s)
          Option

Function Key	Definition
<Enter>-Select/Clear File	Selects or clears a specific file. When a file is selected, a check mark appears next to the filename. When a file is cleared, the check mark disappears.
<F1>-Main Menu	Returns to the Main Menu. Use the Display/ Graph Data option to view graphically a selected file.
<F2>-Save Selected Files to Disk	Saves a list of selected files to the hard disk.
<F3>-Select All Files	Selects all data files in the subdirectory.
<F4>-Clear All Files	Cancels the files which were selected.
<F5>-Copy File to Disk	Enables individual files to be copied to a hard disk.
<F6>-Sort Files By Name	Lists files in alphabetical order.
<F7>-Sort Files By Size	Lists files from largest to smallest.
<F8>-View File Contents	Provides a tabular listing of the contents of the file.

The Display/Graph Data option provides graphs for a selected list of files. Table A-2 describes the default configuration diagrams for each data set. Viewing a list of selected files is controlled by the Graphics Display Control Module screen. On the left side of this screen is a list of the selected files. To activate any file in the list for graphing, highlight it using the cursor arrows and press <Enter>. On this screen, <F1> returns to the Main Menu and <F3> displays the current graph.

Table A-2. Default Configurations for Data Display. The Directory Structure and Filename Convention Are Described in Section 3 and Table 3, Respectively.

Data Set	Default Configuration Diagram
UKMO Ship (Surface)	Ships' positions; color indicates reported sea surface temperature.
MEDS Drifting Buoy	Buoy trajectory; path changes color each month.
UHAWAII Sea Level	Sea level time series.
PMEL Moored Current Meter	UWIND and VWIND time series, UOCN, VOCN and SUBTEMP profiles.
PMEL Moored Temperature	UWIND and SSTEMP time series, SUBTEMP profile.
PMEL Island	UWIND, VWIND, AIRTEMP, and AIRPRESS time series.
IFREMER Ship (Subsurface)	Ships' positions, and SUBTEMP profile.
ECMWF Surface Meteorological Fields	AIRTEMP, AIRPRESS, DEWPOINT, UWIND, VWIND, SENSHEAT, LATHEAT, SSTEMP, TAUX, and TAUY global charts.
CAC Sea Surface Temperature Field	Monthly mean and climatological-mean monthly SSTEMP global charts.
FSU Pseudo-Stress Field	Monthly mean and climatological-mean monthly X- and Y-components pseudo-stress (TAUX and TAUY) charts of Indian and Pacific Oceans.
ORSTOM Pseudo-Stress Field	Monthly mean and climatological-mean monthly X- and Y-components pseudo-stress (TAUX and TAUY) charts of Atlantic Ocean.

Most of the graphical displays use color. White indicates missing data values for the selected parameter, but does not appear on the color legend. The function keys which control the graphing are described in Table A-3.

Table A-3. Function Key Definitions for Display/Graph Data Option

Function Key	Definition
<F1>-Main Menu	Returns to the Main Menu.
<F2>-Snapshot	Saves the current screen to a disk file. The snapshot may be viewed and printed from the Browse/Print Snapshot Files option.
<F3>-Abort/Next Graph	Allows the user to exit the current graph before it is complete. When set to Next Graph, it returns to the Display/Graph Data option so the next file may be graphed.
<F4>/<F5> - +/-	Regulates speed at which data are graphed. A high-pitched tone or warbling tone is emitted by pressing <F4>. The warbling tone indicates that graphing is at maximum speed. <F5> decreases the speed and is accompanied by a low-pitched tone.
<F6>-Pause/Continue	Temporarily pauses graphing activities. Pressing <F6> a second time continues graphing. All other function keys are active while graphing is paused.

The Load/Constrain Files List option allows temporal, geographic, and parameter constraints to be specified to subset a previously selected list of files. The search/constrain function keys are defined in Table A-4.

Table A-4. Function Key Definitions for the Load/Constrain Files List Option

Function Key	Definition
\<Enter\>-Load Files List	Loads a list of files previously saved.
\<Esc\>-Clear Files List	Allows selection and loading of a new list of previously saved files.
\<F1\>-Return To Main Menu	Returns to Main Menu.
\<F2\>-Execute Search	Searches the files in the list according to the specified parameter, dates, and latitudes/longitudes.
\<F3\>-Select Parameter	Allows specification of one parameter from a list. Use the cursor arrows to highlight parameters and press \<Enter\> to select one. \<Esc\> clears the selection.
\<F4\>-Select Dates	Allows specification of start and end dates. Type date in mm-dd-yyy format and press \<Enter\>. \<Esc\> clears the dates.
\<F5\>-Select Region	Allows specification of latitude and longitude coordinates. Type coordinates in xxx.x format and press \<Enter\>. \<Esc\> clears latitudes and longitudes.

The Browse/Print Snapshot Files option allows the user to view graphs which were previously saved during Display/Graph Data. \<F10\> sends the graph to a hardcopy device for printing.

The Exit to DOS option exits the software to the operating system.

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15. Supplementary Notes

16. Abstract   The Tropical Ocean Global Atmosphere (TOGA) Program is a component of the World Meteorological Organization (WMO)/International Council of Scientific Unions (ICSU) World Climate Research Program (WCRP). One of the objectives of TOGA, which began in 1985, is to determine the limits of predictability of monthly mean sea surface temperature variations in tropical regions. The TOGA program created a raison d'etre for an explosive growth of the tropical ocean observing system and a substantial improvement in numerical simulations from atmospheric and oceanic general circulation models. Institutions located throughout the world are involved in the TOGA-distributed active data archive system. One technique to distribute the diverse TOGA data sets, including results from general circulation models, is described in this report.

A compact disk-read only memory (CD-ROM) enclosed in the report contains TOGA data sets for 1985 and 1986, which were prepared by nine institutions. Variables on the CD-ROM are barometric pressure, surface air temperature, dewpoint temperature, Cartesian components of surface wind, surface sensible and latent heat fluxes, Cartesian components of surface wind stress and of an index of surface wind stress, sea level, sea surface temperature, and depth profiles of temperature and current in the upper ocean. Some data sets are global in extent, some are regional and cover portions of an ocean basin.

Data on the CD-ROM can be extracted with an Apple Macintosh or an IBM PC. However, the enclosed diskettes, which contain application software to view data on the CD-ROM, are compatible only with an IBM PC.

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